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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/606,104

06/25/2003

Tzu-Yu Wang

H0004823 (1139.1140101)

4209

22913

7590

07/27/2006

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(F/K/A WORKMAN NYDEGGER & SEELEY)  
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EXAMINER

NGUYEN, PHILLIP

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/606,104	WANG ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Phillip Nguyen	2828	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 and 33-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 and 33-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/5/2006</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1-31 and 33-36 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 102*

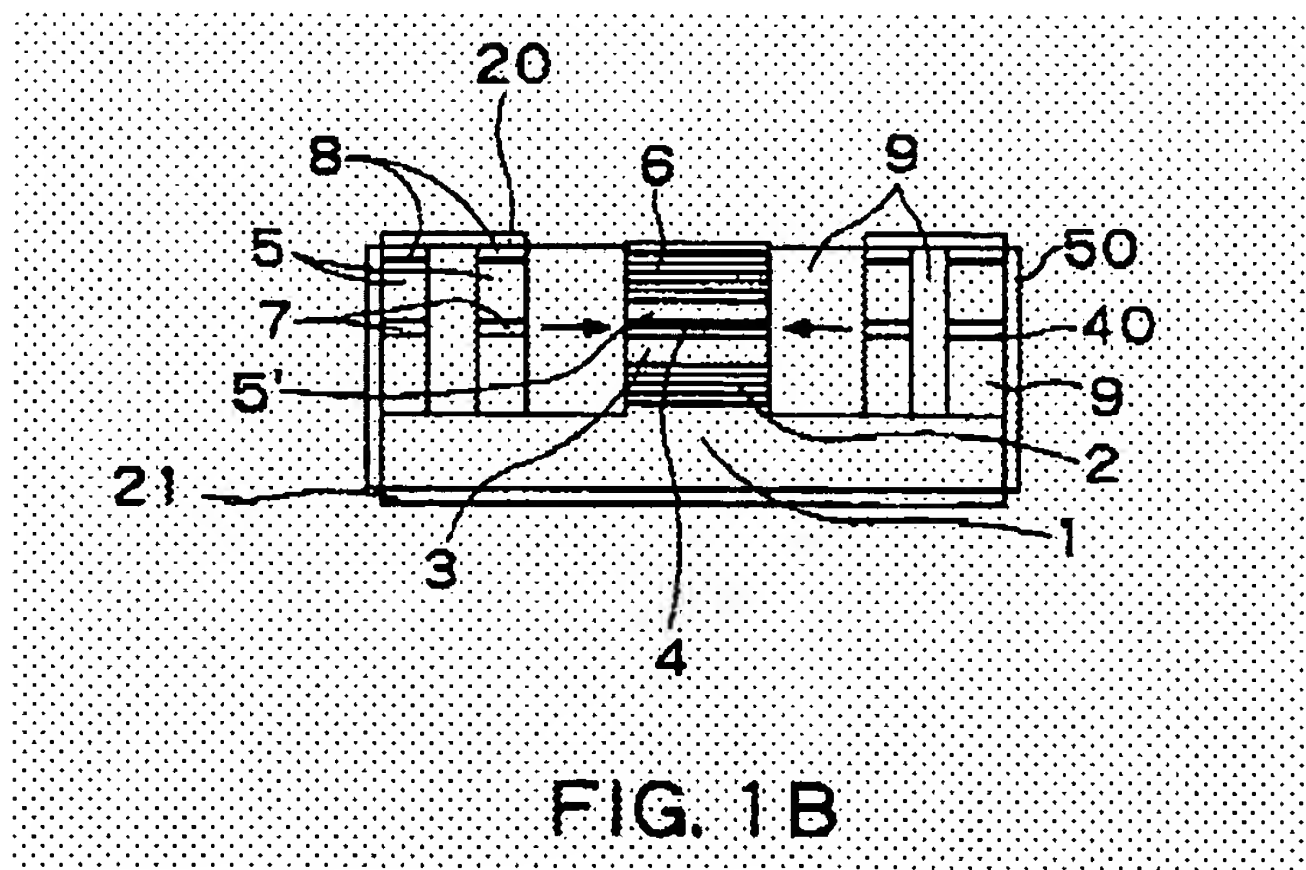
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

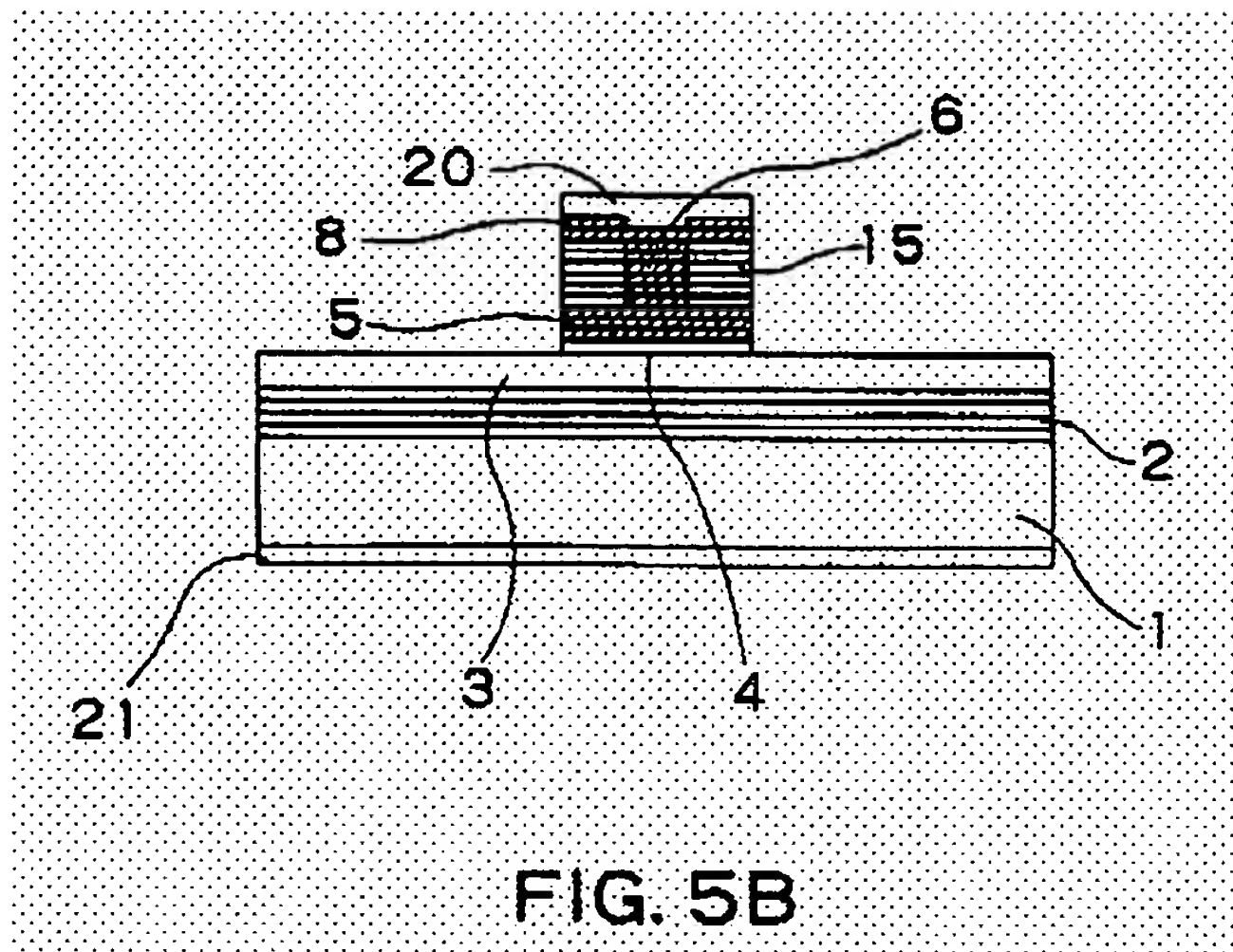
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 8-12 and 16-30 are rejected under 35 U.S.C. 102(e) as being anticipated by

Kinoshita (US Patent No. 6535537).





With respect to claim 8, Kinoshita discloses in Fig. 5B (above) a VCSEL comprising a first mirror 6 having a plurality of layers including at least one pair of layers having InP layer and an oxidized layer (col. 1, ln. 44-47); a cavity proximate to said first mirror; a second mirror 2 proximate to said cavity; and at least two contacts 20 and 21 configured to cause the current to flow through at least a portion of the VCSEL.

With respect to claims 9 and 24, Kinoshita discloses the InP substrate (col. 1, ln. 25-29).

With respect to claim 10, since the applicant fails to further limit the invention by providing more structures of the VCSEL, it is inherent for the same structure of the laser would provide the same result, which in this case, the output wavelength greater than 1200 nm.

With respect to claim 11, Kinoshita also discloses the second mirror 2 comprising a plurality of layers having at least one InP layer (col. 1, ln. 25-29).

With respect to claim 12, Kinoshita discloses the cavity has at least one quantum well (col. 1, ln. 30-32).

With respect to claim 16, Kinoshita discloses in Fig. 5B the VCSEL comprising a substrate 1 comprising InP; a first stack of layers 2 formed on said substrate, first stack of layers

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including one or more layers of InP; a quantum well region 4 formed on said first stack of layers; a second stack of layers 6 formed on said quantum well region; and at least two contacts 20 and 21 configured to cause current to flow through at least a portion of the VCSEL; wherein approximately every other layer of said first stack of layers is at least partially oxidized.

With respect to claim 23, Kinoshita discloses a method for making the VCSEL comprising forming a first stack of layers 2 on a substrate 1, wherein one or more of the layers in the first stack of layers are InP layers (col. 4, lines 37-39); forming a quantum well region 4 on the first stack of layers; forming a second stack of layers 6 on the quantum well region; forming at least one trench (filled up with InP layer 9 after oxidizing) through the second stack of layers, the quantum well region and the first stack of layers nearly up to the substrate; and oxidizing some layers of the first stack of layers via the at least one trench (col. 47-52).

With respect to claims 17, 19, and 25-26, Kinoshita discloses the some layers of first stack of layers 6 comprising InP (col. 1, ln. 45-46) and some layers comprising InAlAs (col. 1, ln. 39).

With respect to claims 20 and 27, Kinoshita discloses some of layers of the second stack of layers comprise InP (col. 1, ln. 25-28).

With respect to claim 21, Kinoshita discloses first and second stacks being DBRs (col. 4, ln. 50-52).

With respect to claims 18 and 28, Kinoshita discloses the thickness of each layer of first and second stacks of layers is approximately one-fourth of an optical wavelength (col. 1, ln. 25-36). It is noted that the claim fails to further limit the invention by not providing the extra method for making the wavelength ranging from about 1200nm to 1800nm. It is believed that

with the same method steps for making the VCSEL as recited in the previous claims, the output wavelength of the VCSEL taught by this prior art would inherently produce the same output.

With respect to claim 29, see the rejections of claims 1 and 24.

With respect to claims 22 and 30, Kinoshita discloses oxidizing a layer in the second stack of layers 6 for confining current in the laser (col. 1, ln. 39-44).

It is noted that Kinoshita teaches the claimed invention in both Fig. 1B and 5B. The DBR stack 6 is the same in both figures.

3. Claims 8-13 and 16-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Jewell (US Patent No. 5881085).

With respect to claims 8 and 9, Jewell discloses in Fig. 10 a VCSEL comprising a first mirror 230 having a plurality of layers including at least one pair of layers having InP layer and an oxidized layer (col. 12, ln. 24-28); a cavity proximate to said first mirror (between two mirrors); a second mirror 244 proximate to said cavity; and at least two contacts 268 and 266 configured to cause the current to flow through at least a portion of the VCSEL.

With respect to claim 10, Jewell discloses the VCSEL has a wavelength greater than 1200 nm (col. 7, ln. 67 to col. 8, ln. 1-2).

With respect to claim 11, Jewell discloses the second mirror 244 comprising a plurality of layers having at least one InP layer (col. 12, ln. 28-30). Note that the second mirror is the top mirror of the reference.

With respect to claim 12, Jewell discloses the cavity has at least one quantum well 238.

With respect to claim 13, Jewell discloses in Fig. 10 second mirror 244 comprises a partially oxidized layer 252 for confining current.

With respect to claims 16-22, Jewell discloses the claimed invention as shown in Fig. 9-10 and the whole specification.

4. Claims 8-10 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Jewell (US Patent No. 5724374).

With respect to claims 8-9, Jewell discloses in Fig. 9-10 a VCSEL (identical to Fig. 9 and 10 from Patent 5881085 except for the reference numbers being changed) comprising a first mirror 186/186' having a plurality of layers including at least one pair of layers having InP layer and an oxidized layer (col. 12, ln. 14-17); a cavity proximate to said first mirror (between two mirrors); a second mirror 210/210' proximate to said cavity; and at least two contacts 220 and 222 configured to cause the current to flow through at least a portion of the VCSEL.

With respect to claims 10 and 36, Jewell discloses the VCSEL has a wavelength greater than 1200 nm and the plurality of layers of the first mirror comprising at least six pairs of layers (col. 1, ln. 58-67).

#### ***Claim Rejections - 35 USC § 103***

5. Claims 1-7 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell (US Patent No. 5881085, hereinafter is '085).



With respect to claims 1-4, Jewell discloses in Fig. 10 (or Fig. 9) a VCSEL comprising a substrate 228; an active region 238 situated on the first mirror; a second mirror 244 situated on the active region; a first electrical contact 268 situated on the first mirror; and wherein said first mirror comprises a plurality of pairs of layers 232 and 234; and one layer of each pair of the plurality of pairs of layers is an oxidized layer (col. 12, ln. 19-24) except for explicitly teaching said one layer has an aluminum content of about 52% before being oxidized. However, Jewell discloses the substrate is InP and the oxidized layer comprising at least one of a group comprising oxidized InAlAs, InAlAsSb, and AlAsSb and the other layer of each pair is made of InP (col. 12, lines 24-30). It would have been obvious to the one having ordinary skill in the art at the time the invention was made to provide the aluminum content about 52% so that the those oxidized layers can be lattice matched with the InP substrate to prevent cracking or dislocation when manufacturing the device.

With respect to claim 5, Jewell discloses in Fig. 9 said second mirror (top mirror) comprises a plurality of pairs of layers and one of layer of at least one pair of the plurality of pairs of layers of second mirror comprises InP (col. 12, lines 28-30).

With respect to claims 6-7, Jewell discloses one layer of at least one pair of the plurality of pairs of layers may include InGaAsP (col. 6, ln. 45-55) or InAlAs (col. 12, ln. 24-30).

6. With respect to claims 14-15, Jewell ('085) discloses the claimed invention in Fig. 10 and an intra-cavity contact layer 236 situated on the first mirror and second contact 268 on said intra-cavity layer except for a first contact on the second mirror and a second contact on the substrate. Jewell also teaches in Fig. 9 two contacts, first one 218 is on second mirror and second one 220



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is on the substrate. It would have been obvious to the one having ordinary skill in the art at the time the invention was made to change the locations of the contacts so that the current conducting thru the VCSEL can be controlled as desired (col. 12, ln. 38-39).

Claims 31 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell (US Patent No. 5724374, hereinafter is '374).

With respect to claims 31 and 33, Jewell discloses in Fig. 9-10 a VCSEL comprising a first mirror 186/186' (bottom mirror) having six or less pairs of layers (col. 1, lines 58-67), wherein at least one layer of the first mirror includes InP and one layer of each pair of layers is an oxidized layer (col. 12, lines 17-20); a cavity proximate to said first mirror; a second mirror 210/210' proximate to said cavity; and at least two contacts 220 and 222 configured to cause current to flow through at least a portion of the VCSEL. However, Jewell does not explicitly teach each oxidized layer in each pair of layers has less than 60% aluminum before being oxidized. As stated above, It would have been obvious to the one having ordinary skill in the art at the time the invention was made to provide the aluminum content less than 60% so that the those oxidized layers can be lattice matched with the InP substrate to prevent cracking or dislocation when manufacturing the device.

With respect to claim 34, Jewell teaches the oxidized layer is formed from material comprising InAlAs (col. 6, ln. 8-19).

***Communication Information***


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip Nguyen whose telephone number is 571-272-1947. The examiner can normally be reached on 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY, can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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AU 2828

  
JAMES MENEFEE  
PRIMARY EXAMINER